upheld the contention of the Marconi Co. that the two kinds of transformers are electrically equivalent, and that the apparatus of the defendants was an infringement of their patent.

The defence disputed the validity of the contested patent, and attempted to prove anticipation, basing the contentions principally on the patents granted to Sir Oliver Lodge and Prof. Braun. It is indeed a fact that the apparatus described by both these inventors contain examples of inductive couplings between the aërial and the oscillation-generating circuits, but it was successfully argued that neither of them had claimed the special kind of loose coupling or the tuning of the circuits that are essential to the satisfactory working of the Marconi system, and are fully set out in the Marconi patent specification. Other scientific investigators were mentioned, such as Henry, Tesla, and Elihu Thomson, who have employed coupled circuits, but their use of a transformer merely to raise the potential of the electrical oscillations produced by the discharge of Leyden jars was not able to be proved to constitute an anticipation or prior user of the essential features of the patent that has now been upheld.

The decision in this case has created a situation the outcome of which it is difficult to foresee, but there is no doubt that a number of companies now working systems similar to that of the Marconi Company will need to close their operations or to change their systems. This will have a marked effect on the grouping of wireless telegraph companies that is being carried out in England and on the Continent at the present time.

A. J. MAKOWER.

NOTES.

THE following fifteen candidates have been selected by the council of the Royal Society to be recommended for election into the society:—Prof. H. T. Barnes, Prof. A. J. Brown, Prof. J. B. Cohen, Prof. W. E. Dixon, Prof. F. G. Donnan, Major E. H. Hills, Dr. W. H. Lang, Prof. J. B. Leathes, Prof. E. A. Minchin, Prof. R. Muir, Mr. R. D. Oldham, Mr. R. I. Pocock, Prof. A. W. Porter, Mr. H. W. Richmond, and Mr. G. G. Stoney.

UNDER the auspices of the Advisory Committee for the Investigation of Plague in India, Dr. G. F. Petrie, of the Lister Institute, left London on February 20 *en route* for Harbin, where he intends to prosecute investigations into the spread of pneumonic plague in Manchuria. Opportunities for extended research into this highly contagious and extremely fatal form of plague infection have only rarely presented themselves, and as all available information points to the fact that the disease in Manchuria is almost exclusively of the pneumonic type, it is hoped that Dr. Petrie's investigations may shed some light on the factors which determine the incidence and spread of this particular variety. With matters of administration and sanitary measures Dr. Petrie will not be concerned. As one of the bacteriological experts whose work in Bombay (1905–7) proved conclusively the *rôle* played by the rat flea in transmitting bubonic plague from rat to man, Dr. Petrie obtained an intimate acquaintance with the disease in its epidemiological and bacteriological aspects, and recently he has been engaged, at the request of the Local Government Board, in determining the extent of the rat infection in Suffolk. The precise form which Dr. Petrie's investigations will assume in Manchuria cannot be determined until the local conditions prevailing in the plague-stricken area and the facilities available for scientific inquiry are known. Dr. Reginald Farrar, one of the medical inspectors of the Local Government Board, is also on his way to Harbin as the British representative on the International Plague Commission convened at the request of the Chinese Government.

IN the Prussian Diet of February 18, Prof. Kirchner, a well-known epidemiologist and administrator in the service of the Ministry of the Interior, is reported to have said that, during the last few weeks, three cases of plague had occurred in London, the infection being conveyed by ship-rats. This statement has been officially denied, and it is probable that Prof. Kirchner had in mind the two isolated cases of plague which occurred in ships on the Thames four months ago (see *The Times*, October 14 and 15, 1910). With the exception of a few imported cases on ships arriving at the docks, no cases of plague have been reported in London since the year 1679. An interesting account of such imported cases in recent years is to be found in *The Times* of February 20. With regard to rat infection, three rats which had probably escaped from a ship were examined at the London Docks in November last, and two of them were found to be suffering from plague, but at present there is no evidence of the existence of a plague epizootic among rats in the London Docks area. The destruction of rats, which was instituted in 1908 owing to the existence among them of a disease declared to be a mild form of plague, is still carried out at the London Docks, and careful precautions are being taken to prevent rats in ships from infected ports from escaping ashore, and possibly initiating an epizootic among the shore rats. Large numbers of cats are also maintained in the various warehouses and sheds.

THE death of the well-known Indian pteridologist, Col. R. H. Beddome, in his eighty-first year, took place on February 23 at his residence, "Sispara," West Hill, Putney. Educated at Charterhouse, Col. Beddome entered the Indian Army in 1848, and became quartermaster and interpreter of the 42nd Madras Infantry in 1856. A keen student of natural history, whose scientific tastes were well known, he was selected to act as principal assistant to the conservator in the newly organised Madras forest department in 1857; three years later he became conservator himself, and held this position until his retirement in 1882. His transfer to the Forest Department led him to give especial attention to botany, more particularly with regard to forest needs, and led to the preparation of a work on "The Trees of the Madras Presidency," published in 1863, followed by an excellent "Flora Sylvatica" of southern India, two quarto volumes, with plates and descriptions of 400 species, published between 1869 and 1874. A professional "Report upon the Nelambur Teak Plantations" was published by Government in 1878. His leisure, however, was given to the systematic study of other groups of plants, one of his earliest papers, published in 1859, being an interesting attempt to reduce to order the south Indian species of the difficult genus Impatiens. In 1863 appeared Beddome's important work "The Ferns of the Madras Presidency," a quarto volume of descriptions and plates which at once stamped him as an authority of this family. The issue between 1865 and 1870 of a similar work on "The Ferns of British India," with descriptions and figures of species not dealt with in the earlier work and the Supplement to that work issued in 1876, only served to confirm the position of authority he had been by common consent accorded. But ferns did not entirely absorb his attention, for between 1869 and 1874 Col. Beddome issued a volume of "Icones Plantarum," with descriptions and figures of 300 interesting species from southern India and Ceylon. Before he left India, he placed students of ferns under a further obligation by the preparation of "Handbook of the Ferns of British India," embodying his rich store of information regarding the family, illustrated by reduced copies of the illustrations to his own earlier and more costly works. This handbook appeared in 1883, immediately after his retirement.

THE King of the Belgians has made a donation of 500*l.* to the funds of the Liverpool School of Tropical Medicine.

M. EUGÈNE TISSERAND has been elected a member of the Paris Academy of Sciences in succession to the late Prof. Tannery.

BY his will, M. Auguste Loutreuil, the son of a small French farmer, who later became a wealthy contractor in Russia, has left 284,000*l.* towards the promotion of science in France. The University of Paris will receive 100,000*l.*, the Academy of Sciences 140,000*l.*, the Pasteur Institute 4000*l.*, and a sum of 40,000*l.* is to provide a fund for scientific research.

DR. BASHFORD DEAN, professor of vertebrate zoology at Columbia University, who was curator of the department of ichthyology and herpetology of the American Museum of Natural History from 1903 until last year, when he resigned, has accepted an invitation to resume that post.

PROF. F. B. LOOMIS, of Amherst College, Mass., will start early in July, accompanied by three of his students, on an expedition to Patagonia. Their principal purpose will be to collect fossils and study the geological problems of the country between the Santa Cruz and Deseado rivers. The expenses of the expedition will be met by the "class" of 1896.

AMERICA has lost one of her pioneers in physical training by the death of Dr. Edward Hitchcock, in his eighty-third year. Since 1861 he had been professor of hygiene and physical education at Amherst College, which gave him at the same time a general oversight of the health and exercise of its students. His work in that capacity had a wide influence, and within twenty years after his appointment fifty American colleges had organised departments of hygiene on similar lines. Dr. Hitchcock was the author of text-books on physiology and anatomy.

A BILL to prohibit the sale, hire, or exchange of the plumage and skins of certain wild birds was read a first time in the House of Commons on February 22. In introducing the measure, Mr. Alden said the Bill had been before a Select Committee of the House of Lords and had been approved unanimously, while in the last Parliament there were only two members who were against it. Twenty-one of our colonies are in favour of the Bill, and possess powers to prevent the export of the plumage of rare birds.

WE learn from *The British Medical Journal* that a lectureship has been established by the National Health Society as a memorial to the late Lady Priestley, who was one of the original members of the committee when the society was started some thirty years ago, and attended all the meetings until within a few months of her death. Three lectures have been arranged for March, the first by Sir E. Ray Lankester on living microbes, the second by Sir Almroth Wright on bacteriology and hygiene, and the third by Mr. Stephen Paget on Pasteur and his work.

A NEW biology and botany section has been added to the Bristol Museum. The new room has been provided by Lady Smyth, and is to be known as the "Dame Emily Smyth Room." The room has been made especially strong in its exposition of the kitchen-garden, fruit-tree, and agricultural pests of the west of England. At the opening ceremony on February 21, the curator, Mr. H. Bolton, said the authorities look forward to the economic biology department becoming practically useful to the farmer, to those who possess orchards, to the small growers, and to every man who loves plants and flowers and cultivates them for his pleasure or profit.

THE summary of the weather for the first eight weeks of the present year, issued by the Meteorological Office, shows that the rainfall for the period was deficient over the entire kingdom except in the north and west of Scotland. The greatest deficiency in any district is 2·83 inches in the south of Ireland, and this is closely followed by 2·74 inches in the south-west of England and 2·53 inches in the Channel Islands. In the Midland counties the deficiency for the two months amounts to 1·81 inches, and in the south-east of England to 1·56 inches. The largest aggregate rainfall for the period in any district is 10·80 inches in the north of Scotland, and the least 1·95 inches in the Midland counties. The rainy days range from 39 in the north of Scotland to 22 in the Midland counties. The mean temperature and the duration of bright sunshine are both in fair agreement with the average. At Greenwich the mean temperature for January was slightly below the normal, and in February it was above the normal to about the same extent, so that the mean of the two months is in absolute agreement with average conditions. Frost occurred in the shade at Greenwich on eight nights, both in January and February. Gales and strong winds were experienced frequently during February over the entire country, and there was a marked preponderance of westerly winds.

BEFORE the Royal Geographical Society on February 27 Dr. W. T. Grenfell, C.M.G., described the most important features of Labrador, a land still hardly known beyond its borders. The Vinland of the Norse sagas, its resources are great, but the polar current dominates its climate, and its southern latitude provides it with a short summer, which has not the continuous sunshine of Alaska and other places farther north. Cold soil and the dryness of the winds cause the stunted nature of many plants, a larch at the south end of Labrador being but 9 inches high and three-eighths of an inch in diameter, though it showed thirty-two years' growth. Except by Prof. R. A. Daly and Mr. A. P. Low, no serious geological investigation has been undertaken; mineral deposits seem to be abundant, but such prospectors and others as have visited the region have worked but for short periods. On the evidence of beaches and glacial deposits, Labrador was said to be rising, possibly as much as 15 or 20 inches per century according to some estimates. The coasts are still but imperfectly charted, and parts are dangerous, but harbourage is plentiful, and the numerous islands and the narrow waterways furnish many facilities for coastal navigation.

IN a former issue of NATURE it was announced that, in connection with the Royal International Horticultural Exhibition to be held in the grounds of Chelsea Hospital in May, 1912, there is to be a scientific section, and a congress will be arranged for the discussion of horticultural education and matters of scientific interest. A special committee has been appointed to look after these subjects, and the first meeting has been held. The chairman of this committee is the Rt. Hon. A. H. Dyke Acland, P.C., and Mr. F. J. Chittenden will act as honorary secretary. The members include Mr. E. A.

Bowles, chairman of the Royal Horticultural Society's scientific committee, Prof. W. Bateson, F.R.S., Prof. Bayley Balfour, F.R.S., Sir Thomas Elliott, K.C.B., Mr. Anderson Graham, Prof. Bretland Farmer, F.R.S., Mr. George Gordon, Mr. H. Rider Haggard, Sir Everard im Thurn, K.C.M.G., Dr. D. Jackson, Dr. F. Keeble, Mr. Donald MacDonald, Mr. W. Marshall, Mr. F. W. Moore, Mr. Spencer Pickering, F.R.S., Lieut.-Colonel D. Prain, C.I.E., F.R.S., Dr. A. B. Rendle, Mr. T. A. H. Rivers, Mr. A. G. L. Rogers, Prof. E. S. Salmon, Mr. A. W. Sutton, Prof. Somerville, Mr. H. J. Veitch, Prof. S. H. Vines, F.R.S., and the Rev. W. Wilks. Whilst the exhibition will be one of the chief spectacular attractions of the London season of 1912, the unique opportunities afforded by the presence of experts from every country will be utilised to the fullest extent for the advancement of horticultural science.

THE Colonial Office announces that, to further the work of the African Entomological Research Committee, Mr. Andrew Carnegie has placed at the disposal of the committee a sum of 1000*l*. a year for three years to defray the cost of sending a few suitably qualified young men to the United States to study the practical applications of entomology. Three of these Carnegie scholars have been selected, and two are now at work in the States. The fact that Dr. L. O. Howard, chief of the Bureau of Entomology at Washington, is interesting himself, is a guarantee that all facilities will be given to the scholars, and the scheme will be of great value to British administration by providing well-trained entomologists for employment by the different Colonial Governments. The research committee was appointed in June, 1909, to promote the study of the insects which spread disease in Africa. Lord Cromer is its president, and it includes eminent authorities on entomology and tropical medicine. The scheme has been taken up by the African colonies and protectorates, and the material already received at the committee's office in the Natural History Museum at South Kensington has increased our knowledge of the insect pests of Africa. The collections of insects, after being identified and recorded, are being distributed to the schools of tropical medicine, universities, museums, or other institutions where they are likely to be of value. Further particulars may be obtained from the secretary of the committee, Mr. Guy Marshall, British Museum (Natural History), South Kensington, London.

A BILL to promote the earlier use of daylight in certain months yearly, and for other purposes relating thereto, has been introduced into the House of Commons by Mr. Robert Pearce. The chief clauses of the measure are as follows:—(1) From 2 o'clock in the morning Greenwich mean time in the case of Great Britain, and Dublin mean time in the case of Ireland, of the third Sunday in April in each year, until 2 o'clock in the morning Greenwich mean time in the case of Great Britain, and Dublin mean time in the case of Ireland, of the third Sunday in September in each year, the local time shall be in the case of Great Britain one hour in advance of Greenwich mean time, and in the case of Ireland one hour in advance of Dublin mean time, and from 2 o'clock in the morning Greenwich mean time in the case of Great Britain, and Dublin mean time in the case of Ireland, of the third Sunday in September in each year until 2 o'clock in the morning Greenwich mean time in the case of Great Britain, and Dublin mean time in the case of Ireland, of the third Sunday in April in each year, the local time shall be in the case of Great Britain the same as Greenwich mean time and in the case of Ireland the same as Dublin mean time. (3) Greenwich mean time as used for the purposes of astronomy and navigation shall not be affected by this Act. (4) This Act shall apply to the United Kingdom of Great Britain and Ireland, and may be cited as the Summer Season Time (Great Britain and Ireland) Act, 1911. We have on several occasions expressed the opinion that the changes contemplated by the Bill are unnecessary and undesirable, and we trust that the measure will meet the same fate as that of previous attempts at so-called "daylight saving."

THE London County Council is doing good service to anthropology by developing the Horniman Museum at Forest Hill. It has now published, at a nominal price, under the title of "A Handbook to the Stages in the Evolution of the Domestic Arts," a useful introduction to the science of technology, prepared by the curator, Dr. H. S. Harrison, under the advice of Dr. A. C. Haddon. Curators of provincial museums might well consider the advisability of adapting this to the collections under their charge.

IN the tenth number, vol. ii., of the Memoirs of the Asiatic Society of Bengal, recently issued, Mr. H. H. Hayden, of the Geological Survey of India, under the title of "Notes on some Monuments of Afghanistan," describes, first, some of the Buddhist Topes near Kábul, and has been able to correct a mistake of James Fergusson in his "History of Indian Architecture," who confuses the Munár-i-Surkh with the Munár-i-Chakri. It is regrettable to learn that the platform of the latter is in so ruinous a condition that, if immediate action be not taken, this interesting monument will inevitably fall. It may be hoped that the Viceroy may be able to put some pressure upon the Afghan authorities in order to avert this catastrophe. He also gives an interesting series of photographs of the celebrated Buddhist carvings at Bámián, and is able to give some new information about them. Occasion was also taken to photograph the tomb of the Emperor Babar, who died at Agra in A.D. 1530 and was buried at Kábul. It is now possible, for the first time, to give in Persian and English the inscription on his tomb.

IN a sixth report on research work, Dr. A. C. Houston, director of water examination, Metropolitan Water Board, gives details of an investigation on the comparative vitality of "uncultivated" and "cultivated" typhoid bacilli in artificially infected samples of raw river water, with special reference to the question of storage. In a previous investigation on the same subject (see NATURE, vol. lxxviii., 1908, p. 377) it was found that in raw river water inoculated with ordinary laboratory cultures of the typhoid bacillus, in one week there was a percentage reduction in the number of bacilli of 99·9, but that a resistant minority of bacilli persisted up to nine weeks in the inoculated water. In the present work the raw river water (5 litres, kept in a partially stoppered bottle in a cellar) was inoculated with typhoid bacilli obtained by centrifugalising the infected urine of a carrier case which had come under the observation of Prof. McWeeney, of Dublin. In this way typhoid bacilli derived directly from the patient, without artificial culture, were added to the water, as would be the case in the natural infection of a water supply. At the end of one week after inoculation, examination showed that the initial number of 770,000 typhoid bacilli per c.c. of water was reduced to 4 per c.c.—a reduction of more than 99·99 per cent. Five subsequent examinations made from the fourteenth to the thirty-fourth day after the commencement of the experiment failed to isolate the typhoid bacillus from 100 c.c. of the water. A second similar experiment gave corroborative results. In addition, Dr. Houston on several occasions drank half a pint of the water after the twenty-third day without ill effect! In another experiment water was inoculated with the typhoid bacillus derived from the same source, but cultivated for several generations on artificial media. The organism in this case was isolated up to the sixth week after inoculation into the water. The conclusion, therefore, is that "uncultivated" typhoid bacilli rapidly perish in raw river water, and that even a week's storage of raw river water is an enormous protection against typhoid infection from such a source.

IN the *Museums Journal* for January Dr. R. F. Scharff, of the National Museum of Ireland, Dublin, describes a dry system of macerating bones for use as exhibits. Formerly this was effected in water tanks, which proved so offensive on sanitary grounds that it was necessary to discontinue their use. Dr. Scharff has now discovered that the object can be satisfactorily attained by covering the bones with dry sea-sand, the bacteria almost wholly performing the work of maceration. Small skeletons are enclosed in boxes filled with sand, and the task of rearranging the bones when they are clean is thus greatly facilitated.

IN *Novitates Zoologicae* for December, 1910, vol. xvii., p. 445, pls. viii., ix., the Hon. Walter Rothschild gives coloured plates of the sea-elephants of Guadaloupe Island and the Falklands. The former is identified with the typical Juan Fernandez sea-elephant described by Linnæus as *Phoca leonina*, which appears to make periodical migrations from that island to Guadaloupe and back. Despite the much greater length of the proboscis in the males of the Juan Fernandez as compared with the Falkland animal, the author points out that other forms indicate a transition in this respect between the extremes, and he therefore proposes to regard all the local forms as races of a single species. This is, perhaps, the most satisfactory conclusion of a problem which has given rise to a considerable amount of discussion and confusion.

THE former existence of one imported giant land tortoise in Ceylon has long been known to naturalists, but it is remarkable that it should have been left to a casual correspondent of an English journal to supply evidence of the occurrence of a second. The first specimen, according to a letter from Mr. Pearson, director of the Colombo Museum, in *Spolia Zeylanica* for December, 1910, was found in Colombo when Ceylon was first occupied by the British in 1796. It was then living in the grounds of a villa called Uplands, in Mutwall, near Colombo; in 1894 it was removed to the Victoria Park, where it survived only a week. It is now preserved in the Colombo Museum, and is identified by Mr. Pearson with *Testudo gigantea* of Aldabra. The length of the shell is 40 inches. In *Country Life* of July 9, 1910, appeared a photograph of a giant tortoise living at Matara, near Galle, taken by Mr. Stanley Mylius, which is reproduced by Mr. Lydekker in an article on giant tortoises in *Science Progress* for October, 1910. That specimen, which is referred to *T. gigantea*, the author thought might be distinct from the Colombo tortoise, and that it is so is indicated at the close of Mr. Pearson's letter. In Mr. Lydekker's article the length of the shell is given as 53½ inches, and it may be that this refers to the Matara specimen, in regard to which Mr. Pearson hopes to obtain further information.

RECENT observations by Prof. S. O. Mast (*Journ. Exper. Zool.*, vol. ix., No. 2) on the reactions of *Amoeba proteus* to light show that a sudden and sharp increase of light intensity causes retardation or cessation of movement; if the intensity be maintained constant for a few moments, the movements of the Amœba begin again. A gradual increase in intensity produces no response, so that the reaction to light depends primarily on the rate of change of intensity. Blue rays (430–490 $\mu\mu$) are nearly as efficient as white light in producing reactions, but violet, green, yellow, and red produce only slight effects. The author suggests that, as other organisms respond most definitely to light of other colours—violet, green, yellow, or red—it is probable that different photo-chemical changes are associated with the reactions to light in different organisms. Prof. Mast has given, in the *Psychological Bulletin*, vol. vii., pp. 267–80, an abstract of literature, of the year 1909, on the behaviour of lower organisms, including a summary of the discussion on the subject of tropisms by Messrs. Bohn, Loeb, Jennings, and Darwin at the International Congress of Psychology, held at Geneva.

THE *Zentralblatt für Physiologie* (Bd. xxiv., No. 17) is almost entirely occupied by an excellent summary, extending over fifty-two closely printed pages, of the numerous papers read before the eighth International Congress of Physiologists, held at Vienna on September 27–30 last. The number also contains three short original contributions. In the first of these Fr. Kutscher gives the results of his examination of the aqueous extract of mushrooms, which he found to contain arginin, cholin, betain, and a hitherto unknown base, the formula of which is similar to that of histidin, with the addition of three methyl groups; but the organic bases form only a very small portion of the extract, the physiological action of which depends on other substances present. T. Kinoshita concludes, after a series of analyses, that normal, fresh human urine contains only a trace of trimethylamine, but, on standing, this substance is formed during some fermentative process. E. Berlin describes a new synthesis of γ-homocholin, starting from β-aminopropylalcohol. Issued with this part of the *Zentralblatt* is a further portion (pp. 177–317) of the Bibliographia Physiologica (third series, vol. v., Nos. 3, 4), prepared by the Concilium Bibliographicum in Zürich, which, with the two preceding parts, contains the titles of papers published in 1909. These are arranged in the usual sections, according to the subjects of which they treat, and there is, at the end, an author-index to the contents of the whole volume.

To the Transactions and Proceedings of the Perthshire Society of Natural Science for 1909–10 (vol. v., part ii.) Mr. R. Dow contributes a life of David Douglas, of Scone, who introduced into Great Britain no fewer than seven species of American conifers, among which *Abietia Douglasi*, although originally discovered in Nutka Sound during Vancouver's voyage round the world, was named in his honour. Douglas was born at Old Scone in 1799, and, after being employed at the Glasgow Botanical Gardens, started in 1824 on a botanical expedition to the banks of the Columbia River and the neighbouring districts. Thence he travelled southwards to California in 1831, and two years later left America for the Sandwich Islands, where he died, as the result of an accident, in 1834. In 1847 a monument was erected to his memory by public subscription in Scone churchyard. Although they were not introduced into Great Britain until considerably later, *Sequoia sempervirens* and *S. gigantea* (the so-called Wellingtonia) were practically discovered by Douglas, the notices of them by Archibald Menzies in 1795 and 1796 being very imperfect.

In the February number of *Petermanns Mitteilungen*, with which *Globus* is now incorporated, Dr. V. Paschinger discusses the results of an investigation of the snowline in different regions. The present article is but a summary, since the full discussion is to be published later, but the main results are here given. The principal determining factor he considers to be temperature, except in regions where the snowfall is exceptionally heavy, when precipitation is more influential climatically. For a certain number of places he has been able to compare the position of the snowline in different years, and finds that generally in the northern hemisphere at the beginning of the 'seventies it occupied a position of minimum altitude, and has reached a maximum level since 1890.

The results of Dr. K. Sapper's journey in the island of South Mecklenburg of the Bismarck Archipelago, undertaken in 1908 for the German Colonial Office, are published in the third Erganzungsheft of the *Mitteilungen aus den deutschen Schutzgebieten.* The topography and physical conditions of the island and others near it were principally studied, but the climate, the densely wooded nature of the region, and the short time available only admitted of a rapid reconnaissance, while the botany and zoology could be scarcely attempted. Using the charts of the German Admiralty as a basis, compass and aneroid were used to determine the land features, which are given in orographically coloured maps; but these, for the above reasons, can only represent the general relief of the island without claiming accuracy of detail. Geological investigation was rendered difficult by the vegetation, and gravel in the stream-beds furnished specimens of rocks which were not otherwise met with. Oligocene limestones and glauconitic sandstones were found; but most of the sedimentary rocks, consisting of sandstones, limestones, tuffs, and clays, are considered to be Pleistocene. Diorite, syenite, gabbro, and granite were met with, but a far larger area is occupied by the younger eruptive rocks, principally andesite.

In Nature, vol. lxxix., p. 234, M. Paul Macey's descriptions of subterranean waterways in Indo-China were referred to. He now supplements his paper in *Spelunca* by an illustrated account of the "Tunnels naturels du Laos" in *La Nature*, 1911, p. 102. We are surprised that he gives no reference to his previous paper, where his adventures and explorations underground were described so cheerfully.

Herr H. Habenicht, of Gotha, has circulated a pamphlet, "als Manuskript gedruckt," entitled "Spuren der Eiszeiten in Norddeutschland und Versuch ihrer Deutung" (Gotha: Andreas Perthes, 1910). It is accompanied by an excellent map in colours. The author directs attention to the absence of true terminal moraines along the margin of the northern glacial drift in its most southerly extension. The deposits in this region, unlike such moraines, show curved forms that are convex towards the north, while their terminations reach down into the valleys that notch the Thüringian, Saxon, and Sudetic border. The author believes that the facts require the occurrence of a great flood between two ice-ages, whereby the deposits of the older ice-age were swept into their present positions against the southern hills. An interglacial diluvium was thus deposited; but an older one also exists. Loess was formed in pre-glacial times during an epoch of continental elevation, and of consequent dryness through remoteness from the sea. A catastrophic falling in of the surface swept the sea water over this, and led to the formation of an old diluvium. Then followed the first ice-invasion, a second uplift and a steppe epoch, and a second general sinking and "Sturmflut des Weltmeeres." The consequent rains brought on the second ice-age, when the glaciers only reached the Baltic region. The mixture of the remains of Arctic and tropical or steppe animals is attributed to flood-action. It is clear that Buckland's early views have lived on, in spite of the conversion of their author.

In a paper contributed to the Spanish Institute of Civil Engineers (Barcelona: Guinart et Pujolar), Dr. Paulino Castells Vidal describes an ingenious balance for finding the real roots of an algebraic or similar equation. This apparatus consists of a horizontal shaft on which are attached cams in the form of equiangular spirals or similar curves, from which may be suspended weights representing the coefficients of powers of x in an algebraic equation; on the other hand, the arms of the levers formed by the cams are for different values of the angular coordinate proportional to the values of 1, x, x^2, for different values of x. Consequently, when the apparatus has come into a position of equilibrium, the pointer attached to the shaft at once gives a real root of an algebraic equation the coefficients of which are the weights of the loads suspended from the cams.

We have received the reprint of a paper, by Mr. Cyril F. Lan-Davis, read before the Optical Society last December, and reprinted from *The Optician and Photographic Trade Journal*, dealing with the theory of the iris diaphragm. Hitherto these useful optical accessories have been mainly designed by trial, with the result that in many cases it has been stated to be impossible to give sufficiently large ranges of aperture for the requirements of modern lenses and their fittings. The author now shows how the problem can be treated by the methods of elementary geometry, and the conditions for maximum range of aperture, as well as for other important requisites, such as a long scale with equal divisions, can be made the subjects of exact calculation. Neglecting the dimensions of the pins which carry the leaves, it is shown that the maximum aperture obtainable is 0·823 of the diameter of the diaphragm itself, and that for this twenty-five leaves are required. This is a good example of a problem where a little mathematics may save a great deal of random experimenting.

Intending purchasers of microscopes and microscopic apparatus will be well advised to consult the list issued by Messrs. R. Winkel, of Göttingen, obtainable from their London agents, Messrs. H. F. Angus and Co., 83 Wigmore Street. Attention is specially directed to the microscope stand No. 1*d*, the fluoride objectives that originated in Göttingen, and an excellent series of complanatic eyepieces giving a particularly flat field. The general workmanship and finish compare favourably with those of other leading makers. The object marker is a new piece of apparatus similar in shape to an objective, and in place of which it is inserted, for marking a circle round any desired spot on a slide. The type supplied for marking covered objects is provided with a diamond point set in a mount that can be rotated.

In the September (1910) number of the Journal of the Franklin Institute, Philadelphia, Mr. J. H. Dellinger, of the Bureau of Standards, made a preliminary announcement of an interesting relation he had discovered between the electrical resistivity, the coefficient of increase of the resistivity with temperature, and the density of specimens of copper of all makes submitted to the bureau for test. According to Mr. Dellinger, the product of the three quantities mentioned is constant for all specimens of copper at 20° C. This result, according to a paper by Dr. S. Lindeck, of the Reichsanstalt, which appears in the January number of the *Verhandlungen der Deutschen Physikalischen Gesellschaft*, is confirmed and extended to very impure coppers and to aluminium and iron by the tests made at the Reichsanstalt during the past five years.

ACCORDING to notices to hand from the Société française de Physique, the *Journal de Physique* is in future to be published by the society, and the three-monthly *Bulletin des Séances* is no longer to be issued. The increased cost is to be met by an increase of the subscriptions to 25 francs for resident and 20 francs for non-resident members. The first issue of the *Journal de Physique* under the new conditions, which appeared early in January, contains a *résumé* by Messrs. Cotton and Mouton of their work on the magnetic double refraction of pure liquids, to which we referred in these columns in November last. The abstracts of papers which have appeared in other periodicals occupy about twenty pages, and seem thoroughly good, but as they nearly all relate to papers published in the early months of 1909, it is evident that much requires to be done before the journal can claim that it is placing the present state of the various branches of physical science before its readers.

WITH reference to an offer recently made to the Calcutta University by the Hon. the Mahárája of Cassimbazar of 20,000 rupees, for the purpose of editing and translating Sanskrit texts dealing with astronomy and mathematics, Dr. G. Thibaut stated, at the meeting of the Asiatic Society of Bengal on February 1, that he will shortly explain the present state of knowledge of Indian astronomy and mathematics, and point out what remains to be done in the way of publishing and translating. In this connection he will deal shortly with the following points:—the successive stages of the development of astronomy and mathematics in India; the characteristic features of each stage; the question whether the astronomical and mathematical knowledge possessed by the ancient Hindus originated in India or was borrowed in part or in its entirety from some other nations (Greeks or Babylonians); the use which has been made of certain data of an astronomical nature met with in the *Veda*, for determining the age of the *Veda* or of Indo-Aryan civilisation.

COMMENTING on the *Waratah* wreck inquiry, *Engineering* for February 24 states that the most important point which emerges from the finding of the Court appointed by the Board of Trade is the recommendation that a committee of experts should be appointed to arrive at some conclusion concerning the minimum stability requirements of different types of vessels at sea. Curves showing these requirements might be utilised for preparing rules for the guidance of shipowners in the stowage of cargo in each ship with greater precision than is now possible. Our contemporary states that it has been the practice with experienced builders, among whom should be classed the builders of the *Waratah*, to supply owners with full information regarding the stability of the ship under all conditions of loading, and with instructions as to the disposition of the ballast, in order to ensure the continuance of satisfactory conditions. But there is no certainty as to whether or not these conditions are scrupulously fulfilled by the officers responsible for the ship. The proposal to institute a committee for the formulation of rules is satisfactory in itself, but something more is required in order to ensure that the rules will be carried out most carefully.

A CONTRIBUTION from the Jefferson Physical Laboratory, Harvard University, appears in the Proceedings of the American Academy of Arts and Sciences for January, giving an account of some experiments on the action of mercury on steel at high pressures. Amagat in 1893 described a case in which mercury was forced by a pressure of 3000 atmospheres in a fine spray through 8 cm. of cast steel, in which no flaw could be afterwards detected with the microscope. In the experiments now described, twelve similar test cylinders were cut from a bar of Krupp's special chrome nickel steel. Six of these were tested under mercury pressure, and the others were tested with a glycerin and water mixture, with ether, and also CS_2. Five of the cylinders tested with mercury burst at pressures from 3000 to 4750 kilograms per square cm.; one burst at 10,250 kilograms per square cm. None of the cylinders tested with other fluids burst, even under pressures of 24,000 kilograms per square cm. Soft steel cylinders show this effect hardly at all, owing to the interference of the lower yield point of the material. Examination of the fracture seems to establish the fact that the lower strength of hard steel cylinders under mercury pressure is owing to amalgamation. Amalgamation once started, it spreads with great rapidity throughout the metal. Two causes hasten the rapidity of the action: one is the natural affinity of mercury and steel, the other is the straining action of the pressure, tending to open the pores. The latter view is strongly supported by the fact that, in the fractures, amalgamation was observed to be most rapid in the direction in which the pores were most distended.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR MARCH:—

March 2.	5h. 58m. Venus in conjunction with the Moon (Venus 2° 20′ N.).
4.	10h. 22m. Saturn in conjunction with the Moon (Saturn 1° 39′ S.).
9.	17h. 23m. Neptune in conjunction with the Moon (Neptune 5° 22′ S.).
10.	21h. 40m. Mars in conjunction with Uranus (Mars, 0° 23′ S.).
18.	14h. 8m. Jupiter in conjunction with the Moon (Jupiter 1° 47′ N.).
20.	1h. 0m. Mercury in superior conjunction with the Sun.
21.	5h. 45m. Sun enters sign of Aries. Spring equinox.
24.	16h. 49m. Uranus in conjunction with the Moon (Uranus 4° 39′ N.).
25.	12h. 3m. Mars in conjunction with the Moon (Mars 4° 15′ N.).
28.	17h. 50m. Venus in conjunction with Saturn (Venus 2° 25′ N.).
30.	12h. Neptune stationary.
,,	18h. 51m. Mercury in conjunction with the Moon (Mercury 2° 22′ N.).
31.	23h. 15m. Saturn in conjunction with the Moon (Saturn 1° 58′ S.).

A REMARKABLE METEOR.—Mr. W. F. Denning writes:—"On February 19, at 9h. 24m., a brilliant meteor was seen by Mr. and Mrs. Wilson from Reigate, Surrey, and by Mr. Peecock from Stowmarket. The object was a very exceptional one for its slowness of flight. At Stowmarket the meteor is described as having a bright reddish-yellow head, with a glowing tail about 15 degrees long streaming behind. It was traced from low in the south-west to low in the north-east. It was in full view for thirty seconds or more.

"At Reigate only the last 27 degrees were observed from just north of Coma Berenices to close to Arcturus. It was the slowest meteor ever witnessed by the observers, who counted sixty, equal to about thirty seconds, while it descended. It showed a bright head, and a yellow tail marked its path.